

## ABSTRACT OF THE INVENTION

The invention provides methods and compositions for differentiating stromal cells  
5 from adipose tissue into cells having osteoblastic properties, and methods for improving a  
subject's bone structure. The methods comprise culturing stromal cells from adipose  
tissue in  $\beta$ -glycerophosphate and ascorbic acid and/or ascorbate-2-phosphate for a time  
sufficient to allow differentiation of said cells into osteoblasts. Such methods and  
compositions are useful in the production of osteoblasts for autologous transplantation  
10 into bone at a surgical site or injury. The compositions comprise adipose stromal cells, a  
medium capable of supporting the growth of fibroblasts and amounts of  $\beta$ -  
glycerophosphate and ascorbic acid and/or ascorbic-2 phosphate sufficient to induce the  
differentiation of said stromal cells into osteoblasts.

The invention further provides methods of identifying compounds that affect  
15 osteoblast differentiation. Such compounds are useful in the study of bone development  
and in the treatment of bone disorders, including bone fractures and osteoporosis.